TOMATO PRICES AND MARKET STRUCTURE in the Lower Rio Grande Valley of Texas

Marketing Research Report No. 588

U.S. DEPARTMENT OF AGRICULTURE, ECONOMIC RESEARCH SERVICE
MARKETING ECONOMICS DIVISION

FOREWORD

This is the first in a group of reports on market structure and pricing efficiency in the Lower Rio Grande Valley in Texas. Future reports will cover other fresh fruits and vegetables. Each will contain information on the structure of particular commodity markets. Relations between variations in market structure and pricing efficiency will be summarized in a final report.

William J. Cremins of the Marketing Field Office, Fruit and Vegetable Division, AMS, at McAllen, Tex., assisted in planning, initiating, and conducting the study. Ralph Winfrey, Federal Market News Reporter at Weslaco, Tex., gave valuable advice on the interpretation of Market News Reports. Frank Gross, Manager of the Texas Valley Tomato and Citrus Marketing Order Committees; Kenneth Martin, Manager of the South Texas Carrot Marketing Order Committee; and Kenneth Warden, Manager of the South Texas Lettuce and Onion Marketing Order Committees, all provided assistance in soliciting the cooperation of firms used in this report.

Many packers and shippers made facilities and records available. Since information was obtained in confidence, their names cannot be revealed, but their cooperation made this study possible.

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HIGHLIGHTS

This study evaluates market performance, in terms of pricing efficiency, for the tomato market in the Lower Rio Grande Valley in 1961. Market performance is appraised with reference to the structure of the market.

An important aspect of market structure is the freedom of entry and exit of firms. From analysis of data on numbers and types of firms during three seasons, it was concluded that entry to the market was easy. This was especially true for smaller firms but also held for larger firms. In terms of identity of firms, the largest firms were the most stable group.

An important aspect of market performance is the relation of f.o.b. and grower prices. When blend f.o.b. prices were compared with grower prices, the two series moved closely together over most of the 1961 season. In the latter part of the season, though, margins became wider and more variable.

The average grower-shipper margin from the start of the season until June 3, 1961, was $1.69 and ranged from $1.17 to $2.66 per wirebound crate equivalent. The average margin for the entire season was $1.79 and varied from $1.17 to $5.49. The higher proportion of lower grade tomatoes and "pinks" after June 3 and the greater proportion packed in lug boxes contributed to these wider margins at the end of the season.

A second aspect of market structure is the degree of knowledge of prices existing among buyers and sellers. Market News reports provide price information to growers and shippers. Market News prices were compared with prices obtained in the survey to determine: (1) whether prices were reported for the proper sizes, grades, and types of containers, and (2) whether reported prices reflected actual transactions. From this comparison it was concluded that Market News Prices: (1) are based on the best selection of containers and sizes possible at present; (2) seem to be more accurate indicators of the high point of the range of f.o.b. prices than of the low point of the range; (3) are highly accurate and reliable indicators of the range of prices paid to growers.

To indicate further whether the Lower Valley shipping-point tomato market behaved competitively, sales to national chains were compared with sales to other buyers. Results indicated no significant differences in the prices paid by the two groups.

Comparison of sales by type of container indicate shippers are sufficiently informed on relative prices of containers. The relation of prices of lugs to prices of wirebound crates was close over the course of the season. The correlation between these two series of prices was .92, indicating that shippers were efficient in adjusting prices of different containers.

For the entire season, net f.o.b. equivalent prices were highest for sales made f.o.b., next highest for delivered sales, and lowest on consigned sales. When f.o.b. prices were compared with f.o.b. equivalent prices of delivered sales on the same day, however, there were no significant differences.

Thus, in 1961, the tomato market in the Lower Rio Grande Valley appeared to have behaved in a highly competitive manner. The market performed efficiently in transferring variations in f.o.b. prices back to the farm level.

TOMATO PRICES AND MARKET STRUCTURE IN THE LOWER RIO GRANDE VALLEY OF TEXAS

by

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INTRODUCTION

The Lower Rio Grande Valley of Texas consists of Willacy, Cameron, Hidalgo, and Starr Counties. The Valley is a major commercial fruit and vegetable producing area.

Tomato harvest in the Lower Valley starts in April and ends in June. During this short period, market prices often fluctuate considerably. For example, from May 17 to June 7, 1961, prices paid growers rose from $1.75 to $7.00 per hundredweight, an increase of 300 percent in 3 weeks. Because of such marked pride variations, farmers, shippers and others concerned with the industry have expressed strong interest in the pricing efficiency of this important shipping-point market.

OBJECTIVES

This report is designed to determine the degree of pricing efficiency in the fresh tomato market of the Lower Rio Grande Valley. Pricing efficiency is described as the manner in which the market converts prices at the f.o.b. level to prices paid farmers. 1/

Theoretically, prices paid growers and f.o.b. prices should vary directly. Increases in f.o.b. prices should be accompanied by increases of the same amount in prices paid growers. In practice, though, certain factors tend to obscure or destroy this relation. For example, an increase in the percentage of U. S. No. 1 grade tomatoes tends to increase grower prices even if f.o.b. prices remain constant. Second, regardless of how low f.o.b. prices fall, prices paid growers probably will not fall below unit harvest costs, since it would then not be profitable to harvest the crop. Third, the relation between f.o.b. prices and prices paid growers will vary whenever packing costs change.

1/ The term "f.o.b." means the produce is placed free on board in "suitable shipping condition", and the buyer assumes all risk of damage and delay in transit not caused by the shipper. The buyer shall have the right of inspection at destination before the goods are paid for, but only for the purpose of determining that the produce shipped complied with the terms of the contract or order at time of shipment.

In figure 1 prices paid growers and f.o.b. prices in the 1961 tomato season are shown as mid-points of the range reported by the Market News Service. The shipping-point margin (the difference between f.o.b. prices and prices paid growers) varied from $2.10 to $5.30 per 60-pound box equivalent over the season. To determine pricing efficiency in the Lower Valley tomato market, such variations in the shipping-point margin should be considered. Specifically, the objective of this study is to determine whether such variations in margins are explained, or caused, by:

A. Variation in the percentage of different grades and sizes of tomatoes sold.

B. Levels of farm prices at or near the level of harvesting costs.

C. Faulty, or incorrect, price reports in the market.

D. Variation in prices paid by different classes of buyers, specifically, national chains and other buyers.

E. Variation in prices received for tomatoes shipped in different containers.

F. Variation in the prices received for tomatoes sold by different terms of sale, such as f.o.b., delivered, and consigned.

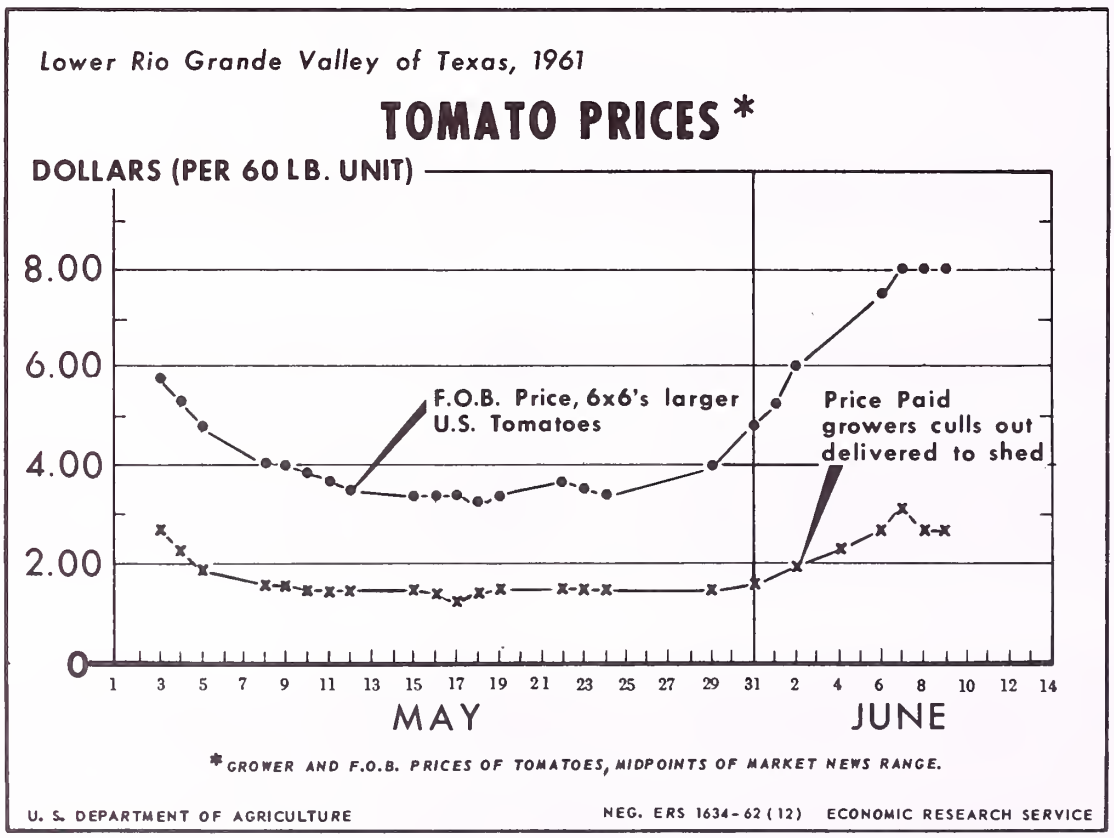

Figure 1

METHODS

Briefly the methods used in this study consisted of (a) sampling a large number of actual sales transactions at the f.o.b. and farm level, (b) estimating the actual relation between f.o.b. prices and prices paid growers, and (c) determining whether factors such as changes in the percentage of all shipments in each grade explain variations in the shipping-point margin. The structure of the market was considered also, since market structure can influence competitive behavior and hence the nature of margins.

MARKET STRUCTURE: NUMBERS OF FIRMS AND RATE OF ENTRY AND EXIT

The structure of a market is an important factor affecting efficiency of price formation. The term "market" means all buyers and sellers of a given commodity with the necessary physical, institutional, and information facilities and services for trading. The economic structure of a market is given by specifying five components: (1) number of firms, (2) the similarity of products sold by the different firms, (3) the ease with which firms can either begin or end operations in the market, (4) the degree to which buyers and sellers discriminate among other buyers and sellers, and (5) how much information buyers and sellers have on market conditions, particularly prices. In this section, attention is given to the first three. No attempt was made in this study to quantify, or measure, discrimination. A later section of the report deals with the general area of knowledge as reflected through Market News Reports.

The average volume per firm in the Lower Valley tomato market varied considerably from 1959 to 1961 (table 1). Both number of firms in the market and total production for fresh market have varied, but not in the same proportion. Harvested acreage of tomatoes for fresh market was 28,000 in 1959, 14,500 in 1960, and 13,800 in 1961.

Table 1.--Number of firms shipping tomatoes and average volume per firm, by size of firm, Lower Rio Grande Valley, Tex., 1959-61

Size of firm 1/	Number of firms			Average carlot equivalents per firm		
	1959	1960	1961	1959	1960	1961
Large	9	7	8	319	187	198
Medium	9	10	9	179	74	91
Small	9	9	8	97	43	52
Smallest	16	11	9	15	10	16
Total or average	43	37	34	130	69	87

1/ Large firms handled 50 percent of total volume; medium, 30 percent; small, 15 percent; and smallest, 5 percent.

Firms in this report, except as otherwise noted, are classified by volume handled as follows: Large - the least number of firms whose collective volume was at least 50 percent of total market; medium - the least number of firms whose volume when added to that of the large cumulates to 80 percent of the market; small - firms whose added volume cumulates to 95 percent; and smallest - all firms remaining in the market in a given year.

Firms in the Valley market included two cooperatives in 1959, three in 1960, and two in 1961. To the extent, therefore, that growers may change packers and sell through a cooperative, some pressure would be exerted to keep independent packers from widening margins at the expense of growers. Such pressure is not measureable. However, its impact would be limited by grower dependence on packers for financing and by contracts made before harvest. In addition, the desire of growers to obtain a firm price as soon as possible would limit such competitive pressure.

No data are presented on the similarity of products of different firms. All firms sold tomatoes for fresh market and on the basis of Federal grades. It is assumed that tomatoes of a given Federal grade are homogeneous products.

Entry, exit, and within-market shifts of volume (volume shift means a change of a firm from one volume category to another) are shown in table 2. Data in table 2 show the final disposition of firms initially in each volume category. For example, of the 9 firms in the large category in 1959, 5 remained in the large category in 1960, and 4 moved to the medium. Also, 16 firms were listed in the smallest category in 1959, but in 1960, 6 remained in this category, 1 moved to the small, and 9 left the market.

Most volume shifts by firms over the course of two seasons were to the next higher or lower volume category. For example, from 1959 to 1960, 24 of 33 changes in volume categories were of this nature. More extreme shifts, however, also occurred. Four firms in the medium category in 1959 were out of the market in 1960, while one firm not in the market in 1959 was in the largest category in 1960.

The large firms made up the most stable group. Five firms remained in this category throughout the 3-year period. In both medium and small categories only three firms remained throughout the period, and in the smallest category, only two firms.

The lowest volume group had the greatest exit rate. Of firms entering the market in 1960, over half went to the small category, while the majority entering in 1961 went to the smallest class.

Comparisons of percentage changes in volume over the 3-year period are based on quartiles rather than the categories previously defined (table 3). Quartiles allow comparison of volume changes among groups. In the 1959-60 period, the smallest firms lost the least volume relative to other groups. While total shipments from the Valley declined 55 percent, firms in the smallest quartile lost only 24 percent of their volume. Except for the largest firms, losses of volume were directly related to size of firm. In the 1960-61 period, the gains in volume were inversely related to size.

These data show that entry and exit of firms in the Valley tomato market appear relatively easy. New firms have entered the market with volumes equal to those of the largest firms. Any attempt by firms in the market to raise margins would have to take into account the likely entry of new firms, and also the possibility of other

Table 2.--Entry, exit, and within-market shifts of volume, Lower Rio Grande Valley Tomato Market, Tex., 1959-60 and 1960-61 1/

1959-60

Size of firm	Category in 1960					Total firms in 1960
	Large	Medium	Small	Smallest	Out of market	
	Firms	Firms	Firms	Firms	Firms	Firms
In 1959:						
Large	5	4	0	0	0	9
Medium	1	3	1	0	4	9
Small	0	3	3	3	0	9
Smallest	0	0	1	6	9	16
Out of market	1	0	4	2	3	10
Total firms	7	10	9	11	16	53

1960-61

	Category in 1961					Total firms in 1960
	Large	Medium	Small	Smallest	Out of market	
In 1960:						
Large	5	1	1	0	0	7
Medium	2	6	1	1	0	10
Small	1	1	4	0	3	9
Smallest	0	1	1	5	4	11
Out of market	0	0	1	3	12	16
Total firms	8	9	8	9	19	53

1/ Large firms handled 50 percent of total volume; medium, 30 percent; small, 15 percent; and smallest, 5 percent.

firms, including cooperatives, increasing their scales of operation. Thus, from the standpoint of numbers and types of firms and freedom of entry, substantial pressure seems to be exerted on firms in the market to behave competitively.

Table 3.--Total volume of tomatoes shipped for fresh market and changes in volume, by quartile of firms, Lower Rio Grande Valley, Tex., 1959-61

Volume quartile 1/	Total carlot equivalents			Change	
	1959	1960	1961	1959-60	1960-61
				Percent	Percent
1 (high).....	3,099	1,499	1,582	-51.6	+5.5
2.....	1,732	604	756	-65.1	+25.2
3.....	658	355	480	-46.0	+35.2
4 (low).....	105	80	147	-23.6	+83.8
Total or average....	5,594	2,538	2,965	-54.6	+16.8

1/ Each volume quartile contains 25 percent of the firms in the market. The first (high) quartile has the 25 percent of the firms with the largest volumes, and so on.

RELATION OF F. O. B. PRICES TO PRICES PAID GROWERS

If firms in a market behave competitively, prices paid growers can be expected to vary closely with f.o.b. prices. In assessing f.o.b.-grower price relations, however, there are several complicating factors. Shippers in the Lower Valley customarily buy tomatoes on a "culls out, delivered to the shed" basis. Except for culls, the farmer is paid a certain price per pound for all tomatoes so delivered. In selling tomatoes, on the other hand, shippers sell on the basis of several grades. Among lots of tomatoes purchased, the proportions of different grades packed can vary considerably. Therefore, shipping-point margins can be expected to vary with changes in the packout even if f.o.b. prices for all grades remain constant.

A weighted average f.o.b. price of all tomatoes sold was computed for measuring the shipping-point margin. The process of weighting the price for each grade by the proportion of all tomatoes in that grade creates a "blend" price at the f.o.b. level comparable to the blend price paid farmers.

Data on f.o.b. and grower prices were obtained from a sample of 12 firms in the Lower Valley. This information included the quantity and price of each grade sold on each day of the 1961 season and daily prices paid growers.

In general, prices paid growers for tomatoes varied closely with the f.o.b. blend price (fig. 2). For the period April 19 through June 3, daily margins averaged $1.69 per 60 pound equivalent. During most of this period (25 of 39 days), the margin varied from $1.50 to $2.00. Of the remaining days, the margin was over $2.00 on 6 days and below $1.50 on 8.

After June 5, the margin widened and variations in f.o.b. and grower prices were not closely related. Several factors apparently could have contributed to this. Whether the increased margins should be attributed to noncompetitive behavior of the industry, or to such factors as increased risk and uncertainty, time lags in price

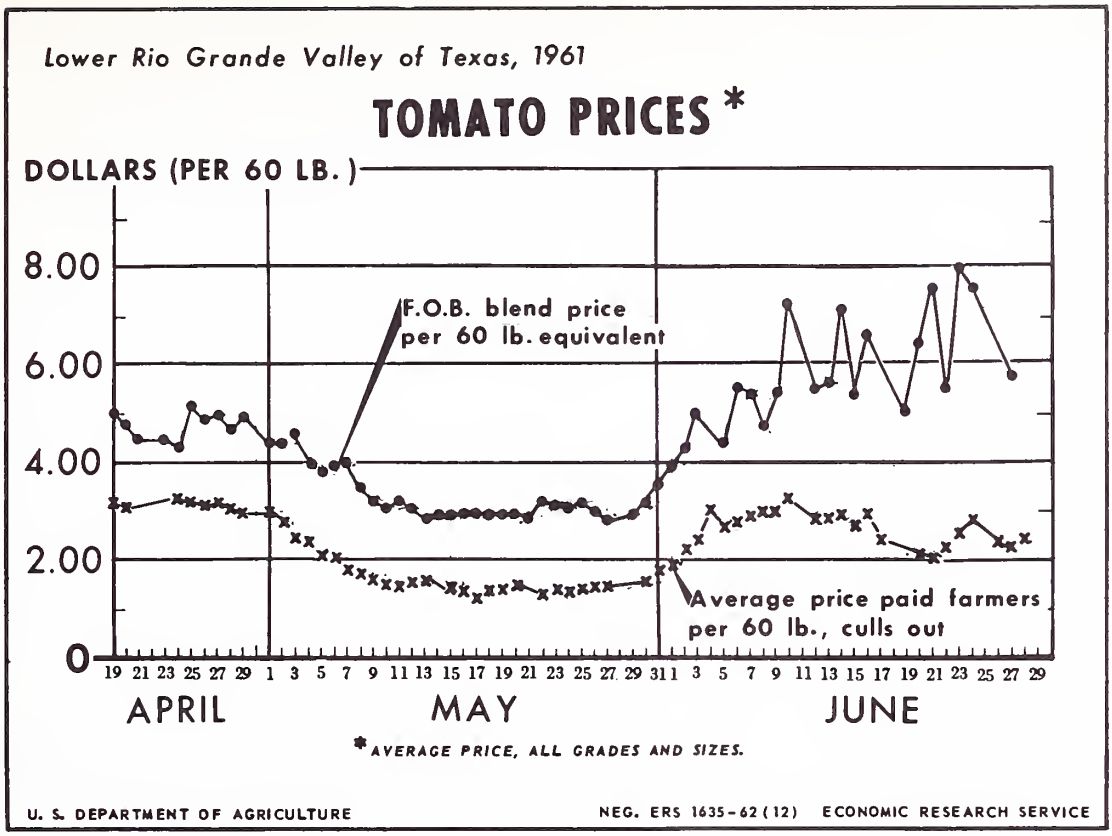

Figure 2

adjustments, or changes in packing costs is not known. Increased packing costs probably were a major factor, because of reduced volume, an increase in the percentage of lower grade tomatoes and an increase in the proportion packed in lugs (table 4). 2/

In summary, f.o.b. prices and prices paid growers were closely related over the major part of the season. Increased margins occurred only after the bulk of tomatoes had been sold. In all probability unit packing costs also increased when margins increased because of the combined influence of (a) an increase in the proportion of lugs and (b) an increase in the proportion of pink and No. 2 grade tomatoes packed. In any event, the period when the two price levels were not closely related involved a small percentage of the crop.

2/ More lower grade tomatoes (pink and U.S. No.2) will increase costs because packing lines must be slowed to allow workers to remove these. Lugs are more expensive to pack than are other containers because of the hand-wrapping operation involved.

Table 4.--Tomatoes for fresh market: Quantity sold and percentage packed in lugs, as U. S. No. 2, and "pinks", Lower Rio Grande Valley, Tex., Apr. 24 - June 19, 1961

Week beginning	Total quantity sold by sample plants	Percentage packed --		
		In lugs	As U.S. No. 2's	As "pinks"
	Pounds	Percent	Percent	Percent
April 24...	678,510	6.5	21.0	7.8
May 1.....	2,005,645	20.4	26.9	2.8
May 8.....	4,403,285	23.0	22.7	6.4
May 15.....	5,423,110	26.3	12.4	3.9
May 22.....	4,853,655	30.8	18.6	6.6
May 29.....	3,812,885	28.4	18.4	9.0
June 5.....	3,355,195	20.8	19.0	9.4
June 12....	664,485	50.5	21.6	10.9
June 19....	248,940	79.2	72.2	27.7

COMPARISON OF SAMPLE AND MARKET NEWS DATA

Conceivably, variations in margins computed from prices reported by Market News could be caused by inaccurate price reports. To determine if this were true, the sample data were compared with Market News reports.

Market News reports are also important as they constitute an element of shippers' knowledge. If these reports are accurate, then shippers have knowledge of prices. This in turn implies that lack of information is not a major factor in explaining diverging shipping-point margins.

Marketing of the 1961 Lower Valley tomato crop began April 19 and continued through most of June. The Federal Market News Service reported f.o.b. shipping-point prices from May 3 through June 9. While prices were not reported for the entire season, the May 3 to June 9 period covered the bulk of shipments from the Valley.

During the entire season, shipments of tomatoes totaled 1,435,181 wirebound crate equivalents. Of these 57 percent were in wirebound crates, 25 percent in cartons, and 18 percent in lugs. 3/ Thus, for reporting prices, the wirebound crate was the most practical, and the Market News Service reported prices for five different categories of tomatoes packed in wirebound crates. Prices also were reported for tomatoes packed in lugs, but not for cartons. Lugs are the logical second choice, even though fewer tomatoes were packed in lugs, since they are wrap packed while cartons, like crates, are jumble packed. In recent years, though, the proportion of tomatoes packed in lugs has decreased substantially. If this trend continues and cartons become more important in the market, then prices of cartons should be reported.

3/ Texas Valley Tomato Committee. Tomato talk. Report of Operations Beginning March 1, 1961, through July 31, 1961.

For any container and grade, only one price was reported for all tomatoes sized 6 x 6 or larger. The sample data were examined to determine the desirability of separate price reports for larger sizes. Prices of sizes 5 x 6 and 6 x 6 tomatoes were the same in two-thirds of the transactions sampled. 4/ Also, Federal marketing order regulations permit packing size 6 x 6 tomatoes in the same container with larger sizes. Therefore, the Market News System of one price for all sizes 6 x 6 and larger is the most practical choice.

F. o. b. Prices

Market News prices at the f.o.b. level were available for comparison with the survey data on 23 of 39 days during the season. Since Market News reported a range of prices, the high and low points of the Market News range were compared with the range found in the survey. The range found in the survey should probably be smaller than the Market News range, since the survey obtained less complete coverage on any day than did Market News.

For U. S. No. 1, 6 x 6 tomatoes, the high point of the range was the same for both Market News reports and the survey on 8 of 23 days (fig. 3). Since the survey included slightly less than 50 percent of the total season's volume, it seems reasonable that the highest price would not be observed in the survey on about 50 percent

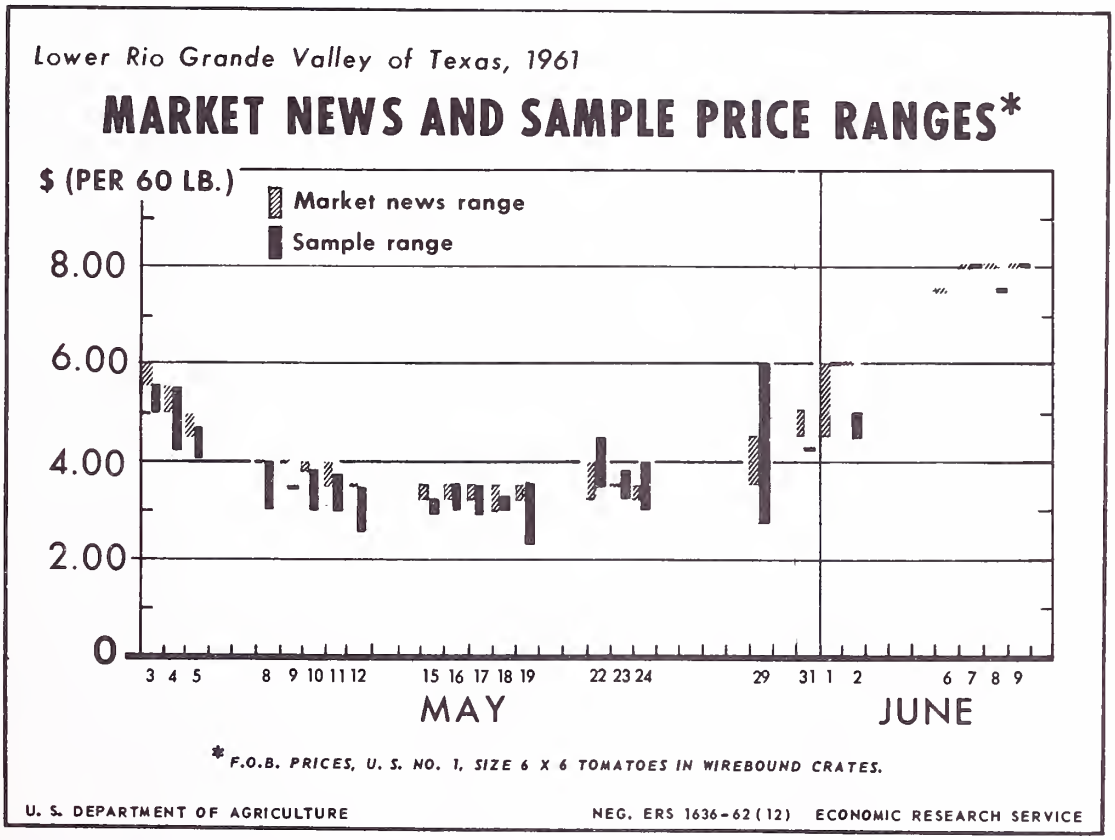

Figure 3

4/ Based on a comparison of high points of the range. Similar results appeared when low points of the range were compared.

of the days. Thus, the survey data do not indicate any discrepancy between reported and actual prices for the high side of the range. The authors heard frequent comments that Market News reports were "too high." The data presented here do not substantiate this claim for the high side of the range.

On the low side of the range, the survey data showed transactions at prices below the Market News reports on 18 of the 23 days. A possible explanation for this is that the survey data may have included other types of sales converted to a net f.o.b. basis. Daily Market News reports are based only on transactions completed on that day. They cannot take into account adjustments made at later dates. Every effort was made to eliminate this possibility in this study, but the possibility still exists, even if remotely.

Prices Paid Growers

Comparison of the survey data and Market News reports on prices paid growers indicates that the range of prices reported covered the vast bulk of tomatoes purchased by shippers. While the range reported by Market News was less than that found in the survey on 16 of 25 days, the bulk of transactions were within the Market News range. On June 1, for example, the Market News quotation was from 2 to 4 cents per lb., while a range of 1 to 4 1/2 cents was found in the survey. However, of 507,741 pounds purchased on that day, all but 30,013 pounds were purchased at prices within the Market News range. Only one firm had prices below the range, and only one had prices above.

Table 5 shows the relation between the weighted average price for all tomatoes purchased by the sample firms and the midpoint of the Market News price quotations.

Table 5.--Grower prices of tomatoes, culls out: Prices per 100 pounds, Market News Service midpoints of daily range and daily weighted average obtained on survey, Lower Rio Grande Valley, Tex., specified dates 1961

Date	Market News midpoint	Survey weighted average	Date	Market News midpoint	Survey weighted average
	Dollars	Dollars		Dollars	Dollars
May:			May:		
3	4.50	4.03	22	2.25	2.28
4	3.75	3.92	23	2.25	2.35
5	3.25	3.46	24	2.25	2.31
8	2.50	2.80	25	2.00	2.35
9	2.50	2.68	29	2.38	2.48
10	2.25	2.59	31	2.50	2.95
11	2.25	2.47	June:		
12	2.25	2.53	1	3.00	3.20
15	2.25	2.34	2	3.75	3.71
16	2.13	2.26	6	4.50	4.45
17	2.00	2.22	7	5.00	4.80
18	2.13	2.29	8	4.50	4.84
19	2.25	2.30	9	4.50	4.83

The average price paid growers was fairly consistently above the midpoint of the Market News range. This indicates the majority of tomatoes were purchased at prices nearer the high point of the range. This comparison was not made as a check of the accuracy of Market News reports, but merely to provide information which can be considered supplementary to the reports.

In summary, tomato price reports of Market News Service in the Lower Rio Grande Valley judged on the basis of the survey data:

1. Are based on the best selection of containers in current use.

2. Are based on the best selection of sizes.

3. Are more accurate indicators of the high point of the range of f.o.b. prices than of the low point.

4. Are accurate indicators of the range of prices paid growers.

SALES TO CHAINS AND OTHER BUYERS

A possible reason for variation in the relations of f.o.b. to grower prices is corresponding variations in prices paid by chains and other buyers. To determine whether such variation existed, several tests were applied.

First, matched pairs of sales were selected. One sale in each pair was to a national chain and the other to a nonchain. Both sales in each pair had the same kind of container, grade, size, selling firm, and as closely as possible, size of lot. All possible matched pairs were selected, that is, whenever a firm sold tomatoes to a chain on any day, if that firm also sold tomatoes of the same size, grade, and container to another buyer on the same day, then that pair of sales was included. From over 3,000 transactions in the sample, only 14 such matched pairs could be found. (These pairs are indicated in table 6 by an asterisk next to the date of sale.) Thirteen of these pairs involved sales in 60 pound wirebound crates. The average difference between prices showed that chains paid an average 1.5 cents per wirebound crate higher net f.o.b. price. The variation was considerable, however, with sales to chains ranging from 70 cents below to 30 cents above the corresponding sale to others. With such variation no significance can be attached to the average difference in prices.

To overcome the disadvantage of the small number of matched pairs, we removed the requirement that each member of the pair be a sale by the same shipper. Thus 39 pairs of sales were obtained, all of which were identical with respect to container, grade, size, and date of sale. For these 39 pairs, shown in table 6, net f.o.b. prices paid by chains averaged 2.66 cents per wirebound crate lower than sales to nonchains (All differences were weighted with the unit weight assigned to 60 pound wirebound crates.) Again the price variation was large, with sales to chains ranging from 75 cents below to $1.43 above the corresponding sale to other buyers. Again, no significance can be attributed to the small average difference.

A further test made was to chart the movement of prices paid by chains together with prices paid by nonchains over the course of the season. This was done for U. S. No. 1 grade, size 6 x 7 tomatoes in wirebound crates, the grade, container, and size category with the greatest number of sales to chains. Again, results were negative. Chains paid slightly higher prices, but there were wide variations in the relation between prices.

Table 6.--Price paid for No. 1 grade tomatoes by chains and nonchains, Lower Rio Grande Valley, Tex., specified dates 1961

Date	Price paid by --		Difference in price	Container	Size
	Chain	Nonchain			
	Dollars	Dollars	Dollars		
May 5	4.50	4.50	--	Wirebound	5 x 6
5	4.50	4.40	0.10	"	6 x 6
6*	4.50	4.40	.10	"	5 x 6
6*	4.50	4.40	.10	"	6 x 6
6	3.50	3.25	.25	"	6 x 7
8*	3.20	2.90	.30	"	6 x 7
9	2.75	3.50	-.75	"	6 x 6
9	2.75	2.40	.35	"	6 x 7
11	3.25	3.25	--	"	6 x 6
11*	2.75	2.90	-.15	"	6 x 7
13*	3.00	3.00	--	"	6 x 7
15*	3.00	3.25	-.25	"	6 x 6
15	2.60	3.00	-.40	"	6 x 7
16*	2.50	2.40	.10	"	6 x 7
18	1.85	1.50	.35	Carton	6 x 7
19	1.85	1.65	.20	"	6 x 7
19*	3.00	2.90	.10	Wirebound	6 x 6
19	2.50	2.50	--	"	6 x 7
19	2.00	2.15	-.15	"	7 x 7
20*	3.00	3.03	-.03	"	6 x 6
23*	3.25	3.25	--	"	6 x 6
24	1.85	1.65	.20	Carton	6 x 7
25	2.15	2.30	-.15	Lug	5 x 5
25	2.15	2.65	-.50	"	5 x 5
25	2.15	2.25	-.10	"	5 x 6
25	2.15	2.25	-.10	"	5 x 6
25	2.15	2.25	-.10	"	6 x 6
25	2.15	2.18	-.03	"	6 x 6
26	2.15	2.65	-.50	"	5 x 5
26	2.15	2.65	-.50	"	5 x 6
26	2.15	2.15	--	"	6 x 6
26	2.15	2.15	--	"	6 x 6
26*	1.65	1.75	-.10	"	6 x 7
31	2.50	2.30	.20	Carton	6 x 7
31	4.25	2.82	1.43	Wirebound	6 x 6
31	3.25	3.40	-.15	"	6 x 7
June 3*	6.30	7.00	-.70	"	5 x 6
3*	6.30	7.00	-.70	"	6 x 6
6*	5.50	5.40	.10	"	6 x 7

* Asterisk denotes pairs of sales made by the same shipping firm.

Further analysis of sales to chains failed to reveal any significant bunching of sales. The sales to chains were fairly well spread over the season, and there was no indication that certain chains bought on particular days when other chains were not in the market.

In summary, the data in this study do not provide any basis for concluding that chains paid higher or lower prices for Valley tomatoes than other buyers during the 1961 season.

RELATION OF PRICES OF DIFFERENT CONTAINERS

One measure of how efficiently a shipping-point market performs in price making is the degree to which prices of different containers are correlated. Theoretically, when the price of tomatoes in lugs changes, the price of the same grade and size tomatoes in wirebound crates should change by the same amount per pound. If the price of lugs, is high relative to the price of wirebound crates, shippers would stop packing wirebound crates and pack only lugs. In actual practice, however, different containers are usually sold to different outlets (crates for repacking, lugs as "originals", that is, received by the retailer in the original container) and this would act to prevent attaining this theoretical relation. Comparison of the degree to which prices of different containers are correlated, however, would provide a measure of pricing efficiency.

Average daily prices of lugs and wirebound crates for U. S. No. 1 grade size 6 x 7 tomatoes varied directly, although the relation was not perfect (fig. 4). The correlation coefficient between prices of lugs and prices of wirebound crates was

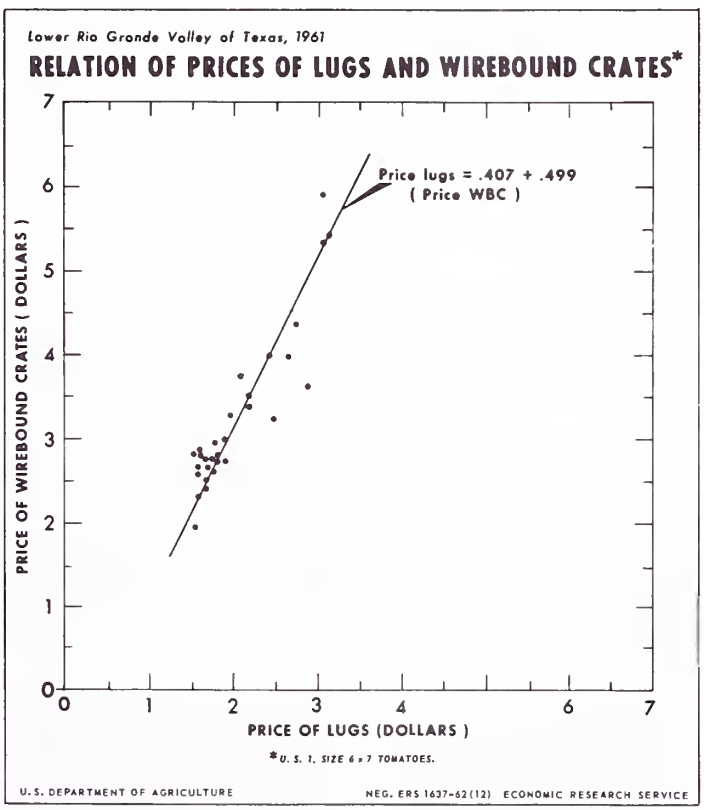

Figure 4

.92, that is, 92 percent of the variation in prices of lugs is associated with variations in the prices of wirebound crates.

In relating prices of lugs to prices of wirebound crates, the relation expected would be of the form:

price lugs = a + b (price wirebound crates)

The constant term "a" reflects the difference in cost of packing 60 pounds of tomatoes in wirebound crates as against lugs. (If there were no difference the "a" term would be zero.) The actual statistical relation was:

price of lugs = .41 + .50 (price wirebound crates),

that is, the constant term "a" is $0.41

The relevance of the "a" term is that an estimate of the lug price would consist of half the given wirebound price plus 41 cents. This indicates shippers behave as if it were relatively more expensive to put tomatoes in lugs than in wirebound crates. This result seems to be true from observation of the industry. Tomatoes shipped in lugs from the Lower Valley generally are wrapped. Wrapping is a time consuming and costly operation, at least compared with packing unwrapped tomatoes in wirebound crates. Of course, actual measurement of the difference in cost by such methods is not warranted.

Since the correlation between prices of the two containers is high, and the statistical relation is a good fit and of the expected mathematical form, the Lower Valley shipping-point market appears to perform efficiently in adjusting prices for different containers. This finding is substantiated by examining the departures of the actual from the "expected" lug price. (The "expected" lug price is the price computed from the linear regression equation.) The actual lug price was within 5 cents of the "expected" price on 13 of 30 days. If these 13 days are considered as days when the container prices were in equilibrium, then the actual lug price fluctuated above and below the "expected" every 2 or 3 days. For only one time period was the actual price below the expected for as long as 5 days.

Graphic analysis of the relation between prices of lugs and wirebound crates for other grades and sizes revealed the same general results as for U. S. No. 1 grade size 6 x 7 tomatoes. (For U. S. No. 2 size 6 x 6 tomatoes, the linear relation was not nearly as clear.) In general, the same conclusion held that the shipping-point market performed efficiently in adjusting prices of different containers.

COMPARISON OF SALES BY TERMS OF SALE

Apart from sales made at auction, shippers in the Lower Valley sell fresh market tomatoes in three principal ways: F.o.b. shipping point, delivered, or on consignment. 5/ Shippers prefer to sell f.o.b. since less work and risk are involved. When markets are firm, shippers have more freedom to select the basis of sale and

5/ The term delivered means that the produce is to be delivered by the seller at the market in which the buyer is located, or at such other market as is agreed upon, free of any and all charges for transportation or protective service. The seller assumes all risks of loss and damage in transit not caused by the buyer and the produce must meet all the requirements as to quality, condition, and grade.

usually will sell f.o.b. When markets are weak, shippers are more likely to sell on a delivered basis or on consignment.

Most tomatoes were sold f.o.b. by the sample firms. During the first weeks of the 1961 season, when prices were high, all sales were f.o.b. Nearly all the delivered and consigned sales in the sample were made during the middle of the season when prices were low. At the end of the season, when prices were at their highest, nearly all sales were again on an f.o.b. basis. The result is that average season prices for f.o.b. sales are considerably higher than for delivered or consigned sales (table 7).

Table 7.--Tomato prices: Average season f.o.b. price per container, by type of container and sale, Lower Rio Grande Valley, 1961

Item	Average net f.o.b. equivalent price for --		
	F.o.b. shipping-point sales	Delivered sales	Consigned sales
	Dollars	Dollars	Dollars
Wirebound crates:			
U.S. No. 1 Size 6 x 6..	3.77	3.00	--
U.S. No. 1 Size 6 x 7..	3.07	2.72	--
U.S. No. 2 Size 6 x 6..	2.68	2.55	--
U.S. No. 2 Size 6 x 7..	2.58	2.06	--
Cartons:			
U.S. No. 1 Size 6 x 6..	2.47	2.27	--
U.S. No. 1 Size 6 x 7..	2.28	--	--
U.S. No. 2 Size 6 x 6..	2.43	1.69	0.71
U.S. No. 2 Size 6 x 7..	2.34	2.05	--
Lugs:			
U.S. No. 1 Size 6 x 6..	2.45	2.09	2.74
U.S. No. 1 Size 6 x 7..	2.13	1.74	1.61
U.S. No. 2 Size 6 x 6..	2.11	1.56	--
U.S. No. 2 Size 6 x 7..	1.68	1.37	--

If the influence of delivered sales occurring on low markets is removed, however, the net f.o.b. equivalents of f.o.b. and delivered sales prices do not differ significantly. During the 1961 season wirebound crates were sold on both an f.o.b. and a delivered basis on 19 days. The number of days each method of sale yielded the higher return was about equally divided. The same results held true for sales of cartons and lugs (table 8).

Net prices on f.o.b. sales were higher than on delivered sales for U. S. No. 1 wirebound crates and lugs but lower for U. S. No. 1 cartons and U. S. No. 2 tomatoes in wirebound crates (table 8). Thus, there appears to be no significant difference in prices for the different methods of sale when sales are made on the same day.

Table 8.--Tomatoes for fresh market: Number of days f.o.b. and delivered sales were made on same day and f.o.b. price per container and grade of tomatoes, Lower Rio Grande Valley, Tex., 1961

Container and grade of tomatoes	Number of days --		F.o.b. price per container for --	
	Both f.o.b. and delivered sales made on same day	Net f.o.b. price exceeded price for delivered sales	F.o.b. sales	Delivered sales
	Days	Days	Dollars	Dollars
Wirebound crates:				
U.S. No. 1 Size 6 x 6..	4	2	3.12	3.00
U.S. No. 1 Size 6 x 7..	5	3	2.79	2.72
U.S. No. 2 Size 6 x 6..	6	3	2.40	2.56
U.S. No. 2 Size 6 x 7..	4	3	1.97	2.06
Total.....	19	11	--	--
Cartons:				
U.S. No. 1 Size 6 x 6..	8	3	2.27	2.32
U.S. No. 1 Size 6 x 7..	1	--	1.90	2.05
Total.....	9	3	--	--
Lugs:				
U.S. No. 1 Size 6 x 6..	15	5	2.21	2.08
U.S. No. 1 Size 6 x 7..	5	3	1.93	1.74
U.S. No. 2 Size 6 x 6..	11	7	1.67	1.50
U.S. No. 2 Size 6 x 7..	7	2	1.36	1.36
Total.....	38	17		
Grand total.....	66	31	--	--

In summary, when shippers can select the terms of sale, they will generally choose f.o.b. Since shippers have greater freedom when markets are firm, season average prices will be higher for f.o.b. than for other types of sale. This result, however, stems from the fact that delivered sales are more likely on a lower market, and does not imply that f.o.b. sales would yield the highest price on any particular day.

CONCLUSIONS

Several facts stand out from the analysis of tomato price margins in the Lower Rio Grande Valley.

1. F.o.b. prices and price paid growers varied closely over most of the 1961 season. Changes in the size of the marketing margin occurred only after most of the tomatoes were sold. Increased margins at the end of the season probably could be attributed to a larger proportion of tomatoes that were packed in lugs and U. S. No. 2 grade.

2. There seems to be no effective means by which farmers or shippers can estimate the size of the margin from Market News Service price reports because information on the relative quantities of various grades, sizes, and containers is not reported.

3. Market News Reports provided fairly accurate information to shippers and others on f.o.b. prices for particular grade and size categories. The reports were more accurate on the high side of the range than on the low side.

4. There seems to be no basis for maintaining that national chains pay either higher or lower prices than other buyers.

5. Shippers are efficient in adjusting to changes in prices of the various containers, and also in equating returns on any day from different methods of sales.

The above facts seem to indicate that market performance during the 1961 season was fairly competitive. The apparent ease of entry and exit of firms also indicates competitive performance.

The finding that the shipping-point market performed competitively does not imply that prices for tomatoes are efficient guides to producers in directing production. Indeed, the wide price variation over the course of the season makes it highly doubtful that tomato prices are useful guides in deciding whether or not to plant tomatoes. On the basis of the factors examined in this study, however, there appears to have been no indication of substantially noncompetitive market performance in the Lower Valley tomato market in 1961.

APPENDIX

Original data used in this study came from a sample of 12 firms which packed and shipped tomatoes during the 1961 season. These firms were part of a larger stratified random sample chosen to provide information on market structure and performance for the entire Lower Valley fruit and vegetable market. The tomato market was considered to be a subgroup of the entire shipping-point market.

Firms in the larger sample were stratified by the volume (carlot equivalents) of all fruits and vegetables shipped. Numbers of firms and desired sampling rates for the larger sample are shown in table 9. Because total shipments of each commodity differed, the stratified sample desired for all commodities was not a stratified sample for tomatoes.

Table 9.--Sampling rates for all fruit and vegetable firms, Lower Rio Grande Valley, Tex.

Fruits and vegetables shipped	Total firms	Percentage of total firms in class	Sampling rate	Number of firms desired in sample	Firms which handled tomatoes
	Firms	Percent		Firms	Firms
500 carlots and over	18	13.95	100	18	8
250 to 499 carlots	26	20.16	50	13	2
100 to 249 carlots	24	18.60	50	12	2
10 to 99 carlots	37	28.68	25	10	0
Less than 10 carlots	24	18.60	0	0	0

The number of tomato shippers from which data were obtained are more generally biased towards the larger volume groups than is the desired sample of all firms (table 9). This is an important finding, and will have distinct relevance to a study of the overall market structure in the Valley. For this specific report on tomatoes, however, it limits the data.

While the firms studied do not constitute a true stratified random sample from the universe of all tomato shippers in the Valley, they represented 49 percent of all tomatoes shipped in 1959, 46 percent in 1960, and 49 percent in 1961. Also, firms from which data were unavailable when the survey was made accounted for an additional 14 percent of 1959 volume and 11 percent of 1960.

The number of firms in each volume category (as defined on p. 4) from which data were actually obtained are shown in table 10.

Table 10.--Number of tomato shippers and firms in sample, by volume class, Lower Rio Grande Valley, Tex., 1961

Volume class 1/	Total tomato shippers	Firms in sample	Percentage of total firms in sample
	Shippers	Firms	Percent
Large	8	5	63
Medium	9	4	44
Small	8	2	25
Smallest	9	1	11

1/ Large firms handled 50 percent of total volume; medium, 30 percent; small, 15 percent; and smallest, 5 percent.

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